REMARKS

Claims 1-74 and 78 are now pending in this application, with Claims 46-74 having been withdrawn from consideration. Claims 1, 11, 16, 26, 31, 41, and 43 have been amended to define more clearly what Applicant regards as his invention. Claims 1, 16, and 31, of the claims currently under consideration, are in independent form. Favorable reconsideration is requested.

Applicant notes with appreciation the indication that Claims 5, 6, 12-14, 20, 21, 27-29, 35, 36, 42-44, and 78 would be allowable if rewritten so as not to depend from a rejected claim, and with no change in scope. These claims have not been so rewritten because, for the reasons given below, their base claims are believed to be allowable.

Claims 1-4, 7, 8, 10, 11, 15-19, 22, 23, 25, 26, 30-34, 37, 38, 40, 41, and 45 were rejected under 35 U.S.C. § 103(a) as being obvious from U.S. Patent 6,195,465 to Zandi et al. ("Zandi") in view of U.S. Patent 6,668,090 to Joshi et al. ("Joshi"); and Claims 9, 24, and 39, as being obvious from Zandi in view of Joshi, and further in view of U.S. Patent 6,229,927 to Schwartz.

Claim 1 is directed to a method of entropy coding of discrete wavelet transform coefficient bits that are arranged in code blocks and coded in bitplane order using three coding passes for each bitplane. Transform coefficients of a code block are pre-analyzed in sign-magnitude form to determine statistical data about the coefficients. The statistical data is stored, and based upon the statistical data, a command for arithmetic encoding of a sequence is generated. The sequence comprises a plurality of bit and context pairs for the code block, and the command specifies a length of the sequence.

The amendments to Claim 1 are for the purposes of clarifying that the command for a code block is based on the statistical data regarding the coefficients of the code block. Claim 1 also recites that the command is for a plurality of bit and context pairs. By virtue of the claimed features, the arithmetic encoder can generate a code word for the sequence in a single clock cycle, as opposed to the prior case in which *m* clock cycles are required for the arithmetic coding of a sequence comprising *m* pairs.

Zandi, as understood by Applicant, relates to a compression and decompression system in which a reversible wavelet filter is used to generate coefficients from input data, such as image data. Zandi uses a reversible wavelet filter in a lossless or lossy system in which an embedded codestream is generated from the coefficients produced by the filter. An entropy coder performs entropy coding on the embedded codestream to produce the compressed data stream (Abstract). The encoder of Zandi comprises an ordering and modelling mechanism coupled to the reversible wavelet filter to order the plurality of coefficients and binary values within the plurality of coefficients in order to create the embedded codestream.

At column 27, lines 35 - 50, Zandi discusses how the coding of a coding unit may make use of probabilities and statistics obtained from the encoding of a different coding unit. In one embodiment, some or all of the statistics and probabilities are saved when a coding unit has been coded. These then act as the initial statistics when coding of a later coding unit begins (col. 27, lines 38 - 39). Zandi also discusses another embodiment in which the classes for all images are evaluated and a hard-coded set of statistics are determined. Then, coding is performed using these hard-coded statistics as a default (col.

27, lines 45 - 48). In a further embodiment described by Zandi, statistics are saved for each bitplane such that when coding in the similar bitplane in another tile, the statistics are used (col. 27, lines 48 - 50).

It is submitted the arrangements discussed in Zandi are different from the process of Claim 1. In Claim 1, the transform coefficients of a code block are pre-analyzed to determine statistical data about the coefficients. The statistical data is stored and used to generate a command for arithmetic encoding of the same code-block. This is not taught or suggested by Zandi, where the statistics and probabilities are obtained during the encoding of a different coding unit to the coding unit currently being processed. The coding units of Zandi are defined in col. 5, lines 10 - 21, and col. 28, lines 25 - 44. In one embodiment, the coding unit is defined by one line of trees and, with four levels of decomposition, which implies that in the spatial domain the size of a coding unit is 16 lines by the width of the image. The statistics and probabilities used in Zandi are thus not derived from the coefficients currently being entropy coded.

Furthermore, according to Applicant's understanding there is no teaching or suggestion in Zandi of generating a command for arithmetic encoding of a sequence, wherein the sequence comprises a plurality of bit and context pairs. It is submitted that Zandi teaches away from the concept of a single command that applies to the encoding of an entire sequence. In column 22, lines 21 - 25, Zandi states that:

> "Once the entropy coder has been initialized, processing logic models each bit of each coefficient with the context model and entropy codes the bits (processing block 1308). After entropy coding the bit, the data is either transmitted or stored (processing block 1309)".

Zandi thus teaches processing each bit. There is no teaching or suggestion in Zandi of a single command for encoding an entire sequence.

The Office Action, at page 3 and page 7, argues that Zandi teaches generating, based upon the statistical data, at least one command for at least one sequence for arithmetic encoding. The Office Action refers specifically to column 27, lines 37- 39, of Zandi. That cited portion states:

> "In one embodiment, some of the statistics or all are saved. These then act as the initial statistics when coding of a later coding unit begins."

Applicant has carefully reviewed the cited passage and the surrounding text, but cannot identify any teaching or suggestion of a command for arithmetic encoding of a sequence, wherein a sequence comprises a plurality of bit and context pairs for the code block, and wherein the command specifies a length of the sequence, as recited in Claim 1.

Joshi, as understood by Applicant, relates to a method for the formation of layers of a compressed bitstream in a JPEG 2000 encoder in such a manner that the layers correspond to increasing visual quality level. Joshi further relates to a method for rate control of one or more compressed digital images having layers which correspond to the increasing visual quality level.

Applicant has found nothing in Joshi that would remedy the deficiencies of Zandi discussed above. Therefore, Applicant submits that any hypothetical combination of Zandi and Joshi (even assuming such combination to be permissible) would not teach or suggest the method of Claim 1.

Applicant has found nothing in Zandi or Joshi, either separately or any permissible combination (if any) that would teach or suggest pre-analyzing transform coefficients of a code block in sign-magnitude form to determine statistical data about the coefficients, storing the statistical data, and generating, based upon the statistical data, a command for arithmetic encoding of a sequence, wherein the sequence comprises a plurality of bit and context pairs for the code-block, and wherein the command specifies a length of the sequence, as recited in Claim 1.

Accordingly, it is submitted that Claim 1 is clearly allowable over Zandi and Joshi, either separately or any permissible combination (if any).

Independent Claims 16 and 31 are apparatus and computer program product claims, respectively, corresponding to method Claim 1, and are believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

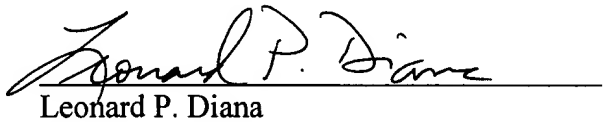
The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

This Amendment After Final Action is believed clearly to place this application in condition for allowance and, therefore, its entry is believed proper under 37 C.F.R. § 1.116. Accordingly, entry of this Amendment After Final Action, as an earnest effort to advance prosecution and reduce the number of issues, is respectfully requested. Should the Examiner believe that issues remain outstanding, it is respectfully requested that the Examiner contact Applicant's undersigned attorney in an effort to resolve such issues and advance the case to issue.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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